

Avionics Firms Explore Micro-Microelectronics

Defense Dept.'s effort to accelerate and exploit micro-microelectronics technology is being replicated by some of the nation's industrial giants in the expectation it will have an equally pervasive impact on their non-defense activities.

A representative sample of these companies, engaged in a diverse spectrum of activities, includes General Electric, Honeywell and American Telephone & Telegraph Corp.

This is General Electric's third attempt into the technology. The company was among the first licensed to produce transistors in the early 1950s, several years after their invention by Bell Laboratories. The transistor was a competitor to vacuum tubes, of which General Electric was then a leading manufacturer.

Adequate Resources

But General Electric did not commit adequate resources, including its Corporate Research and Development Center, to advancing semiconductor technology. Thus the company failed to achieve a leading position in the transistor field during the 1950s and lacked the technological base to exploit the semiconductor microcircuit when it was developed by Texas Instruments in the early 1960s.

In the late 1960s, General Electric

announced plans to establish itself in the commercial semiconductor microcircuit field but soon concluded that the investment required to close the technological gap was not worth the potential return.

By the time the company bowed out of the commercial market, however, its Aerospace Electronic Systems Dept., in Utica, N. Y., a military avionics systems producer, had acquired a hybrid chip fabrication facility and a limited custom-design semiconductor fabrication capability.

By the mid-1970s, General Electric recognized that its defense/aerospace operations needed to enhance this in-house custom microcircuit facility to remain competitive. Funds were approved to modernize the Utica facility to permit design and production of very complex function devices with 5-micron feature sizes. It was planned to upgrade the facility later to produce more complex function 3-micron devices.

By late 1978 when the Pentagon announced plans for its very-high-speed integrated circuit (VHSIC) program with its near-term goal of 1.25-micron devices leading to submicron devices, General Electric's largely computer-controlled microcircuit facility was in operation.

The company's Electronics Laboratory, in Syracuse, had developed innovative

architectures and design techniques for coming generations of systems on silicon (AW&ST Mar. 26, 1979, p. 62).

Additionally, the interest of scientists at the Corporate Research and Development Center had been refocused on semiconductors, spurred in part by work on new device types. The company also had set up a Solid-State Applications Operation in Syracuse to refine semiconductor manufacturing technology for use at the Utica facility. Thus, spurred principally by General Electric's defense and aerospace systems needs, the company had acquired a full spectrum of microelectronic capabilities. But they were only loosely integrated and oriented primarily to serving the aerospace/defense field.

Rejuvenation Plans

In the spring of 1979, General Electric's chairman and chief executive officer, Reginald H. Jones, challenged company top executives to recommend plans for invigorating the company's position in the electronics field.

This led to studies that indicated that by 1983, "approximately 40-50% of GE's business would be driven by our ability to obtain advanced custom-design microcircuits," according to a company official.

Last August, General Electric said it would build a \$55-million Microelectronics Center in North Carolina's Research Triangle Park near Raleigh-Durham to serve as a central design and production facility for the company's industrial and consumer products.

The company also disclosed plans for a



ER-2 Earth Resources Observation Aircraft Nears Completion

ER-2 high-altitude earth resources observation aircraft that Lockheed is building for the National Aeronautics and Space Administration is shown in artist's concept (AW&ST Dec. 3, 1979, p. 23). The ER-2, a version of Lockheed's U-2 strategic reconnaissance aircraft, is to be delivered to NASA's Ames Research Center in Mountain View, Calif., in May. The wing-mounted "superpods" will carry a variety of scientific experiments. The ER-2 will augment

Ames' two U-2 scientific research aircraft but will be able to carry triple the U-2 payload to higher altitudes and longer ranges. Additional payload compartments are in the nose and behind the pilot. The ER-2 will carry two camera systems, and its instrumentation will include a high-altitude multispectral scanner, digital X-band synthetic aperture radar, linear array scanner, real-time data link and multicomponent experiments for a variety of purposes.



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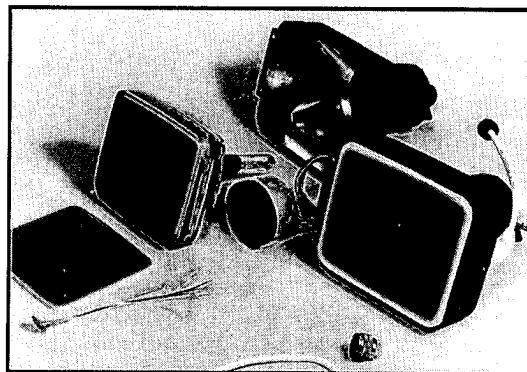
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